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ON

# RHEUMATIC CARDITIS.

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THE common occurrence of some form of cardiac complication in rheumatic fever is well known, yet I doubt whether the extreme frequency of such affections is appreciated, except by those who have either subjected the cases which they have themselves treated to a careful analysis, or have paid special attention to the facts which have been published by others. In the following paper I shall avail myself of the general conclusions deduced from analysis of the cases which I have treated at the Royal Free Hospital and at St. Thomas's, between 1846 and the spring of 1872, of which the details are published in two reports: one contained in the first volume of the 'Transactions' of the Clinical Society, the other in the third volume of our own 'Reports.' To these reports the following communications must, indeed, be regarded as supplementary.

Of the cases referred to I find that 76 out of 233 had some form of recent cardiac affection, either alone or in combination with previous disease of the heart, giving the proportion of 32·6 per cent., or 1 case in 3·06. In 15 cases also there was old heart disease without any recent affection, or in 6·4 per cent., or 1 case in 13·3. Taking the two series together, we get a total of 91 cases in which there was some form of heart complication, or 39·05 per cent., or 1 case in 2·56 of those treated. This proportion is rather less than has been deduced by some other observers, and I suppose may be

fairly taken as about the average in cases of rheumatic fever treated in hospital, though it is doubtless greater than obtains in private practice, at least among persons of the middle and upper ranks who come under treatment at the early period of the attack. Dr. Fuller, in his work on 'Rheumatism,' has given a table of 588 cases collected from various sources; some of them recorded by himself in the practice of the different physicians at St. George's Hospital, others reported by Dr. Latham, Dr. Budd, Dr. Taylor, and M. Bouillaud. In these the proportion of cardiac complication ranged from 57·01 per cent., or 1 case in 1·71, in the practice of M. Bouillaud; to 48·03 per cent., or 1 case in 2·06, in the cases treated at St. George's; the mean of the whole being 52·04 per cent., or 1 case in 1·91.

Taking therefore these statements as representing the average results, it will be found that the frequency of cardiac affection varies according to the nature of the attack and the condition of the patient.

The influence of the former is shown in the greater liability to complication in some forms of rheumatism than in others; in the character of the epidemic, the intensity of the disease, and the period from the commencement of the attack at which the case comes under treatment, and also as to whether the seizure is the first which the patient has had, or he has suffered previously.

1. The occurrence of carditis is almost limited to the acute fibrous form of rheumatism. It is seldom if ever seen in the synovial, gonorrhœal, or syphilitic subacute forms, though I have known old disease to exist in such cases, and recent complication occasionally occurs in the malarious cases.

2. There can, I think, be no doubt that the frequency of heart affection in rheumatic fever is influenced by the character of the epidemic, in the same way as pneumonia, typhoid, erysipelas, and other forms of febrile disease vary in severity and in their peculiar features at different times. In my first report I showed that the proportion differed very remarkably in the cases which I had treated at the Royal Free Hospital, at old St. Thomas's, and at the Surrey Gardens; but these differences were probably chiefly due to the regulations in the

several institutions for the admission and treatment of the patients. Recently, however, the percentage of cardiac disease in the cases treated has differed without there being anything to explain the difference, except the varying character of the disease. Thus, in 1868, the proportion of complication was 20 per cent.; in 1869, 35·2 per cent.; in 1870, 10 per cent; and in the earlier part of 1871, 25 per cent. Yet the cases while in the hospital were placed under precisely similar circumstances, and indeed in by far the largest number, the signs and symptoms of carditis were present at the time of the patients' admission.

3. The frequency of heart affection is much the same in the more severe and in the slighter forms of rheumatic fever, though it is somewhat greater in the former. Thus, while 37·5 per cent. of the severe cases had recent disease, 31·9 per cent. of the slighter attacks were complicated. There is, however, a very striking difference between the kind of complication which occurs in the two sets of cases, pericarditis being most common in the slighter forms of rheumatism, while endocarditis is especially frequent in severe cases. Indeed, while the former is very often seen in cases which are of very trivial character, endocarditis chiefly occurs in severe rheumatic fever, and may be said to be almost a measure of the intensity of the disease.

4. All forms of recent cardiac complication are most apt to arise in the early stage of rheumatism. In only 13 or 14 out of the whole number of cases did the symptoms and signs of disease present themselves after the patient had come under treatment. Occasionally, indeed, the heart affection precedes the development of the external rheumatism, and not unfrequently the two are almost coincident.

5. Cardiac affections are most common in cases in which there have been previous rheumatic attacks. This appears to be very completely established by a calculation given in the last report, from which it is shown that while only 11·3 per cent. of the cases of first attack had any recent complication, disease occurred in 45 per cent. of those in which there had been previous seizures. This inference is also rendered probable by the facts analyzed in the first report, though the previous history in those cases is less satisfactory. It is, however,



opposed to the conclusion arrived at by Dr. Taylor,<sup>1</sup> who thought pericarditis more common in first attacks of rheumatic fever.

The influence of individual peculiarity on the proportion of cardiac complication is shown by the effect of sex, age, and the previous state of health of the persons attacked.

6. Men are somewhat more liable to suffer in this respect than women. Of the former the proportion of cases with recent heart disease was 35·4 per cent., or 1 case in 2·8. Of the latter, the proportion was 30·69 per cent., or 1 case in 3·3. The difference to the disadvantage of men is probably due to their being more exposed to the causes of the disease, and continuing to follow their occupations for a longer time after the commencement of the symptoms before they come under treatment.

7. A much more marked influence on the frequency with which the heart is affected in rheumatic fever is, however, to be ascribed to the age of the persons attacked. Of the whole 233 cases, 33·3 per cent. of those of 20 years of age and under had some form of recent disease; 29·3 per cent. between 21 and 40 years were similarly affected; and of those between 41 and 53 inclusive, the proportion who suffered was only 16·6 per cent., showing that the occurrence of cardiac complication is much more to be apprehended in young people than at more advanced ages.

8. Cardiac complications are probably also of more frequent occurrence in persons previously out of health and debilitated, though I am not ble to give a numerical statement in support of this opinion. There are few cases of rheumatism of longer duration and more difficult to cure than those which occur in females who have been recently confined or have been long nursing, and I believe that the heart is disproportionately liable to be involved in such cases.

### *Pericarditis.*

Pericarditis is slightly less frequent than endocarditis, but not uncommonly the two forms of affection coexist. Dr. Taylor says that he met with it in only 8 per cent., or 1 in 12·5 of the cases which he treated. My own observations, however, show a larger proportion than this. Of the 233 cases included in the two reports, pericarditis occurred in some form in 36, or

<sup>1</sup> 'Medico-Chirurgical Transactions,' vol. xxviii.



15.45 per cent., or 1 case in 6.47. This calculation embraces all the cases treated, both those in which there was pericarditis alone, and the cases in which the inflammation was superinduced on old heart disease; while Dr. Taylor does not appear to have included the latter class of cases in his estimate.

The general symptoms which attend pericarditis are very indecisive. Pain especially is a very uncertain symptom. In a large proportion of cases no complaint is made of pain, though generally, when the disease is fully established, there is a feeling of uneasiness or oppression in the region of the heart. Tenderness is an equally uncertain symptom. Sometimes the whole of the præcordial region is tender, and occasionally some pain is caused by pressing between the cartilages or under the left false ribs; but this sensitiveness to the touch may exist in cases of rheumatism in which the pericardium is not affected, and doubtless it has its seat in the integuments or intercostal muscles, and is not in any material degree an assistance to the diagnosis. It has been thought that when pain is felt in pericarditis it is from the presence of pleurisy; but this does not appear to afford an adequate explanation, for the two affections may coexist without there being any material amount of pain; and pleurisy also, whether occurring in rheumatic fever or independently, is often not attended by serious suffering. The presence or absence of pain in both forms of inflammation seems very much to depend on the condition of the patient, and the mode in which the disease is developed. If the patient be very weak and prostrated, and the attack commences in a slight form and gradually becomes more intense, pain may not occur; whereas when inflammation is suddenly developed in a previously healthy person there is probably always more or less severe suffering. The intensity of the inflammatory process seems, indeed, mainly to influence the degree of pain which it causes.

Often in the early stages of rheumatic pericarditis the breathing is very little affected, though it generally becomes short, hurried, and irregular when there is active inflammation and after any considerable amount of effusion has occurred, and sometimes it is so urgent as to compel the patient to sit partly upright in bed. With the commencement of the local affection the pulse is generally quickened, rising to 110 or 120, and with the increase of the effusion it may become very rapid and irregular

or intermittent. The action of the heart also, which is at first regular, may become embarrassed and tumultuous in the advanced stages, and when there is a large amount of fluid effused.

The tongue, when the local inflammation sets in, is generally altered in appearance. Instead of the white or whity-brown coating, a little disposed to be dry in the morning, which usually attends a well-pronounced but uncomplicated case of rheumatic fever, the tongue will become more thickly coated, the fur of a browner hue and the surface dryer, and sometimes it is decidedly brown and dry. If, indeed, in any given case the tongue assumes the latter character, it may be suspected that some form of local inflammation is present, though it does not follow that the disease has its seat in the heart. It may be either in the pleura or lung.

Sometimes, also, there are symptoms of cerebro-spinal disturbance. The patient may be very restless and excited, there may be slight tendency to ramble or active delirium; or tremor of the extremities and choreic symptoms: the former being especially frequent in men who have been living intemperately, and the latter more particularly occurring in young persons and females.

The only symptom, however, which I believe to be invariable is, that there is a considerable rise of temperature so soon as the cardiac complication sets in; and this rise is often very remarkably seen in cases of rheumatic fever which had been previously of a very slight or trivial character. Thus the temperature, which may not have exceeded  $100^{\circ}$  or  $101^{\circ}$ , with the occurrence of pericarditis will rise to  $102^{\circ}$ ,  $103^{\circ}$ ,  $104^{\circ}$ , or even higher; but the rise of temperature equally occurs if the pleura or lung be the seat of inflammation. I do not know that the condition of the skin is materially altered by the occurrence of any of these local affections, though perhaps it is more apt to become dry, especially during the night, than in ordinary uncomplicated cases of rheumatism.

The diagnosis of pericarditis can only, however, be effected by the physical signs. The first peculiarity which is observed in a case of rheumatic fever when the pericardium is becoming affected, is often a systolic sound, to which I have heard the term "*tension sound*" applied, and I do not know that I can give a better name to it. It gives the impression that the muscular

contraction of the heart is performed with undue energy. To this a rustling sound succeeds ; or, in other cases, the rustle is the first morbid sound heard. At first the rustle is only very slight, barely perceptible, and is heard perhaps only at intervals, as when the chest is distended with air at the end of a full inspiration. It is so short as only to occupy a small portion of the cardiac action, and is not sufficient to mask the natural sounds of the heart. The rustle is generally first heard at the sternum and towards the upper part of the præcordial region, but it gradually spreads over the whole space, and increases in intensity. At length there is a distinct double *bruit de frue frue*, as it is termed by the French, which entirely masks all other sounds. The rustle first heard probably indicates the dryness of the serous membrane, while the decided friction marks the occurrence of exudation. The friction-sounds are characterised by their extreme superficiality ; they give the impression of sounds produced immediately at the end of the stethoscope as if caused by the rubbing of the instrument on the skin. They are limited to the præcordial region, or extend from that space equally in all directions. The characteristic sound is double, but sometimes towards the apex there is only a single rub with the systole. The intensity of the sound and the period during which it continues to be heard vary greatly. There may only be the faint rustle, and it may very rapidly disappear, being heard only for a few hours. In other cases the friction sound is very loud and persistent, continuing three or four days or a week, and I have known it distinctly heard for fifteen days. When, however, the sound is very prolonged there is generally some previous disease and hypertrophy of the heart, or the pericardium may be partially attached by old adhesions. In cases of this kind the serous membrane seems less readily to pour out fluid, probably from the pressure upon its surface ; in the same way as in cases of pleuro-pneumonia, dry friction may be heard for several days, while in simple pleurisy the friction generally soon disappears from the layers of pleura being separated by the liquid effusion. In the one case the lung being consolidated, is incompressible ; in the other the organ readily collapses under pressure. When the friction-sound disappears, it may be by the subsidence of all the signs of disease, but more frequently it is from the outpouring of fluid. The area of dulness is then extended, espe-



cially in the vertical direction. The friction, however, generally disappears gradually, first below and then above at the upper part and right side of the præcordial space. It may also, in some cases, be for a short time reproduced by making the patient draw a full breath or lean forwards, or in children, by making firm pressure on the chest with the stethoscope. This, however, can only occur when the fluid is small in quantity. When the friction-sound ceases to be heard, the heart's sounds may again become audible, and sometimes they are heard distinctly and naturally, even when there is probably a considerable amount of fluid. More generally, however, they are flat and imperfect, and when there is a large accumulation, much muffled or masked. When also there is much effusion, the area of dulness is very greatly extended, rising to the second or even to the first inter-cartilaginous space on the left of the sternum. The dull space has also a peculiar pyriform shape, being wider below and narrower at the upper part, and often there is a very obvious prominence in the præcordial region. In some cases also, where there is a large accumulation, a wave-like pulsation can be perceived in several of the intercostal spaces. The rapidity with which the fluid is thrown out varies very much, so that in some cases the amount will be very large in a few hours, while in others the effusion will only very gradually increase.

The duration of this stage is also very variable. The effused fluid is generally only slowly removed, but sometimes it disappears very quickly, so that in the course of a few days there may be a very rapid accumulation and equally rapid disappearance of fluid; the quickness or slowness of the effusion and of the reabsorption being probably influenced by the greater or less intensity of the inflammation, and the larger or smaller proportion of fibrine contained in the effused fluid. Most generally, however, the absorption is very gradual, the dulness on percussion diminishing from above downwards; and as the fluid disappears, the friction sound returns, being first heard at the upper part and right side of the dull space, and gradually falling to a lower level. The returning friction is generally of a harsher note than that which is first heard, and often towards the apex there is only a single systolic sound. The second friction may be only of short duration, or may be heard during a long period, and

usually, as the cure progresses, the sound assumes a rougher and more creaky character—the *bruit de cuir neuf*—when the surfaces of the pericardium are becoming adherent. Occasionally also, when the friction, whether primary or secondary, is very marked, a more or less distinct vibration is conveyed to the palm of the hand placed on the præcordia. The prominence of the præcordial space diminishes with the absorption of the fluid, and sometimes this change is immediately detectable by the eye, when there is very little alteration in the area of dulness. The fluid may also be removed without there being any return of friction, and I have known this occur when the effusion had been rapid, and when therefore it might have been supposed that the inflammation was very intense and the fluid charged with a large amount of fibrine. Finally, after a longer time, all morbid sounds may disappear; but I believe that always when there has been prolonged friction, and when therefore it may be concluded that the two layers of pericardium have become adherent, the area of dulness remains larger than it should be. This is, I think, due to the lung being, as it were, pushed aside, so as to bring a larger portion of the heart in contact with the parietes of the chest. It is noticed at the end of the acute attack, and long before it is possible for the heart to have become enlarged as the result of the pericarditic adhesions.

The diagnosis of pericarditis in the early stage is not generally attended with much difficulty. The superficial seat of the friction sound, its peculiar character, and its limitation to the region of the heart or equal extension in all directions from that space, distinguish it from a recent endocarditic murmur. When, however, there is only a single systolic sound heard towards the apex, it may be doubtful whether such sound has its seat in the external surface of the heart or in the mitral valve, and consequently whether there is pericarditis alone, or some recent endocarditis combined with it. Sometimes, also, a cardiac friction sound occurs in cases of pleurisy of the left side, and may be mistaken for a pericarditic sound; but this error may generally be avoided by careful examination. There will, of course, be the obvious signs of pleuritic effusion, and the friction with the action of the heart will only be heard on the left side of the præcordial region. If, on the other hand, the friction sound be really due to pericarditis, it will either be

heard over the whole space, or, if only partial, will very generally be limited to the right side and upper part of the præcordia, towards the mid sternum.

In the later stages of pericarditis when the lymph is becoming more firm and adhesions are in progress, the sound is often of a creaky, stretching character, and very closely resembles some valvular murmurs, and it may be very difficult to say whether the disease is endo- or exocardial.

### *Endocarditis.*

This form of disease is of somewhat more frequent occurrence as a complication of rheumatic fever than pericarditis. I have met with it in 16·7 per cent. of the cases treated, or in 1 case in 5·9. It is also more common in the severe forms of the disease, while pericarditis generally occurs in the slighter cases.

The general symptoms by which its presence is indicated are even more indecisive than those of pericarditis. There may be some uneasiness in the region of the heart or decided pain; the action of the heart may be quick and irritable; the breathing may be rapid, laboured, and irregular; but all these symptoms are often absent or very slightly marked, and do not generally occur until the disease has been some time in progress, and the valves have become much thickened or exudations or deposits of lymph have occurred upon them, so as seriously to interfere with the functions of the heart. Generally the temperature is more or less elevated with the occurrence of endocarditis. The constitutional disturbance varies with the character of the local disease. In ordinary cases there is simply some aggravation of the ordinary symptoms of rheumatic fever, but occasionally there is what may be termed ulcerative or destructive endocarditis, and in these cases the fever assumes a typhoid type, and bears, indeed, a very close resemblance to ordinary typhoid, the patient becomes rapidly prostrated, and thrombosis of the affected orifice or embolism of the distant arteries, may occur. The diagnosis of endocarditis can, however, only be effected by the physical signs. These consist of murmurs, generally of a blowing character, heard at the different orifices of the heart, and with the acts of contraction or dilatation, or at both periods. If there is obstruction to the flow of blood into the aorta from thickening of the valves or deposits on their surfaces, there is a systolic murmur heard at the



base and in the course of the aorta. If, on the other hand, the valves cannot properly close or if they are partially destroyed, there will be a diastolic murmur heard about the middle of the sternum. In the mitral valves the disease leads to thickening and to vegetations or deposits on the auricular side of the valves, which should apparently obstruct the flow of the blood from the auricle into the ventricle. In this case the murmur produced would be heard at the time of the auricular contraction, or immediately before the ventricular systole occurs. Generally, however, the sound seems to be systolic, and must therefore be due either to the thickened valves closing less rapidly, or to their not being properly adjusted, and so allowing of regurgitation.

The errors which may be committed in the diagnosis of endocarditis may be the mistaking a murmur which is really due to an old valvular defect for the indication of recent disease, the supposing an exocardial sound to have its origin in the endocardium, or the mistaking a murmur dependent on hæmic conditions for one caused by organic change.

The first two errors may very easily be committed, and can indeed only be guarded against by a careful collection of the previous history of the patient, and by repeated stethoscopic examinations. The third mistake may be avoided by bearing in mind that all forms of cardiac complication generally occur at the earlier periods of the disease, when the symptoms are most active; whereas the anæmic murmurs are heard towards the end of the attack when the patient is becoming prostrated. They are also not attended by an increase of temperature, but usually occur when the temperature has fallen to the natural standard or even below that point. They are generally first heard over the pulmonic orifice or in the course of the pulmonary artery, and are often limited to that situation; or if audible in the course of the aorta or towards the apex, they are almost always to be heard also in the pulmonary artery, and they are generally accompanied by rough systolic murmurs in the carotid and by continuous murmurs in the jugulars. The anæmic murmurs are usually of a soft blowing character, but sometimes they are rough and croaking, and though often loud, they are also frequently only heard over a very limited space. As the patient's condition improves they become more and more localized to the pulmonary orifice and finally disappear. I need scarcely say



that serious structural changes so rarely occur in the valves of the pulmonary artery as the result of acute disease, that if in any given case a murmur is heard in that situation, the great probability is that it is anæmic.

### *Myocarditis.*

Myocarditis is rather interesting in a pathological point of view than practically important. It probably always occurs in connection with one or both the other forms of disease, and is chiefly seen in persons previously in a low state of health, and especially in those of dissipated habits.

The subjacent muscular structure of the heart is often more or less involved in affections both of the investing and lining membranes, and occasionally a large portion of the walls have apparently been the seat of inflammation. This is especially seen at the apex of the ventricle in cases of pericarditis, and at the base when the aortic valves have been inflamed.

Sometimes the inflammation of the muscular structure goes on to suppuration, so that the tissue becomes infiltrated with pus, and very rarely a true circumscribed abscess is formed. I have seen one such case, which occurred in the practice of the late Dr. Cragie, at the Edinburgh Infirmary. The abscess occupied the septum of the auricles and was bilocular, and each portion was sufficiently large to have lodged a cob-nut. One portion had opened into the origin of the aorta, and the other was on the point of bursting into the cavity of the pericardium. There was also pericarditis and extensive disease of the aortic valves. The subject of the affection was a female, thirty-five years of age, of very irregular habits, who had suffered from rheumatic pains for several weeks, and in whom the right knee was swollen and tender. She was in a state of great agitation and alarm, but was intelligent when spoken to. She had occasional attacks of severe dyspnœa, but at other times was able to lie down on the back or on either side. The existence of heart disease was not ascertained during life, and indeed was not suspected, her excited condition being ascribed to her intemperate habits. There are, indeed, no means by which inflammation of the muscular structure of the heart could be diagnosed during life, though the reported cases have generally been characterized by hurried and tumultuous action of the heart, feeble and irregular pulse, urgent

difficulty of breathing, and great distress and agitation of mind and sometimes by active delirium, with rapid prostration of strength.

The *morbid appearances* in the earlier stages of pericarditis consist in the presence of lymph, of harder or softer consistence, on the surfaces of the attached and reflected pericardium, and of a yellowish opaque fluid in the cavity. The solid exudation generally has a peculiar velvety or honeycombed appearance. At the later periods the two surfaces are more or less firmly adherent, and often the lymph is in distinct layers, and at a still later period the adhesions are cellular and the reflected pericardium is with great difficulty capable of being torn off, the adhesions being the most complete at the base of the heart, about the right auricle and between the commencing portions of the aorta and pulmonary artery. Frequently, indeed, when the attachment of the two surfaces is only partial, the adhesions are limited to those positions; and if they be extensive but not universal, the left and posterior surfaces of the organ are the parts which are most generally free.

The milk spots which are so frequently found on the surface of the heart are, doubtless, the remains of slight attacks of pericarditis. They are especially common on the surfaces of the right auricle and ventricle, and almost always coexist with more or less adhesion between the auricle and the trunks of the aorta and pulmonary artery. They are generally capable of being removed from the pericardium, leaving the membrane underneath entire and transparent. That the adhesions and white spots are most common on the right auricle and ventricle is probably owing to the greater force of the left ventricle pushing away the exudation from its surface; while it accumulates, where there is less resistance, or on the surfaces of the right ventricle and auricle and between the large vessels.

In cases of acute endocarditis there is at first only opacity and thickening of the serous membrane, with exudation or deposit of fibrine on the surface. This may assume the form of vegetations about the edges of the valves or of larger layers.

In the aortic valves the deposit may occupy either the ventricular surface of the valve which remains exposed when the segments are closed, or it may occur on the crescentic margin over which the valves when shut come in contact. Subsequently the

valves become contracted and indurated, and the sinuses behind them shallow, so that they both obstruct the flow of blood into the artery and allow its return into the ventricle. In the mitral valves the exudation chiefly occupies the auricular edges and surfaces, and the folds become adherent together, so as to form a more or less tight ring. The whole of the endocardium both of the left auricle and ventricle, is opaque and much thickened, and in the auricle the surface is often rough. Perforation and breaking down are most commonly seen in the aortic valves, probably from the greater pressure which they have to sustain. Occasionally, also, there is some erosion and softening of the muscular substance at the base of the left ventricle, and in this way passages may be formed leading towards the right auricle or ventricle, the origin of the aorta, or the left auricle. If this occur at what is called the "*undefended space*"—the triangular space between the contiguous sides of the right and posterior semilunar segments, in which the muscular portion of the inter-ventricular septum is naturally partially defective—a communication between the cavities on the two sides of the heart may result, which may simulate a congenital defect.

If during the first or acute stage of the inflammation the muscular substance be much involved, the endocardium and muscle to a greater or less depth may break down under the pressure of the blood, and an aneurismal tumour may result—the *false consecutive aneurism* of Breschet, or the *acute aneurism* of Rokitansky. If, on the other hand, after the occurrence of exudation into the muscular structure, the inflammation be partially recovered from, the muscular fibres may become atrophied and be replaced by fibroid tissue, which, being less resistant, may admit of expansion, and form the *true aneurism* of Reynaud.

### *Prognosis.*

In reference to the prognosis in cases of rheumatic carditis, we must consider not only the immediate danger to the life of the patient, but also the liability to the occurrence of changes in the structure of the heart, which, though unimportant at the time, may lay the foundation of serious disease at a more distant period.

The immediate danger is not great. It very rarely happens that uncomplicated rheumatic carditis proves fatal. Of the 74 cases in which there was some form of recent disease with or without



old heart affection, three only terminated unfavorably, and in all these there was previous disease—the sequence of former rheumatic attacks—and in one of them the kidney was affected also. The proportion proving fatal was thus only 4·05 per cent.

The danger of the inflammation being only imperfectly recovered from is, however, greater. Thus in 34 cases only out of the 74, in which there was recent disease, did the signs entirely disappear before the patient was discharged from the hospital. In 15 of these cases, however, there was previous affection of the heart at the time of admission, and in these the signs of old disease remained, and the evidence of recent inflammation subsided; but whether the previously existing mischief was aggravated or not it is almost impossible to say. Deducting these cases, there were 54 cases of recent disease only, and in 34 of them the signs entirely disappeared, or in 62·9 per cent., and in several others they were nearly gone—so that the result cannot be regarded as unfavorable. It is quite possible, also, that in some of the cases in which the signs remained there may have been an entire recovery after a longer time had elapsed; and in several instances not included in this calculation, there were slight symptoms or signs of disease at the time of the patients' admission into the hospital which did not more fully develop themselves, and in which the arrest of inflammation may fairly be ascribed to the treatment pursued. On the other hand, however, it must be mentioned that cases do occasionally occur in which patients who have been discharged entirely cured of rheumatic attacks, either simple or complicated by heart affection, return after some months with decided signs of cardiac disease.

The circumstances which influence the result of treatment are chiefly the previous state of health of the patient, the period after the commencement of the symptoms at which he comes under treatment, and the seat and form of the disease.

If the patient be previously in a low state of health, especially if he have any disease of the heart, both the immediate and ultimate danger is much increased. Inflammation of the lungs and pleura, which so frequently occurs in connexion with carditis, and affections of other organs, particularly of the kidney, also adds to the risk.

The recovery is less complete and much more tedious if the

cardiac symptoms have become fully established before the patient comes under treatment. Thus, of 12 uncomplicated cases of recent carditis, in which the signs were present when the patients were admitted into the hospital, in 7 they entirely disappeared, and in 5 they remained at the time of discharge; while in 12 cases in which the cardiac affection came on while the patients were under treatment, in 8 they entirely disappeared, and in 2 were very nearly gone when the patients left the hospital.

The form and seat of the disease also influence the result. Pericarditis is certainly more readily and completely curable than endocarditis. In 7 cases of recent pericarditis the signs entirely disappeared in all but one, and in that case they were nearly gone; while in the same number of cases of pericarditis and endocarditis combined, they entirely disappeared in only two. The time during which the signs of pericarditis continue is also generally less than that in which endocarditic murmurs are heard. The ready curability of pericarditis is to be ascribed to the comparative state of rest of the inflamed membrane, and to the more purely local character of the disease. Indeed, it probably only becomes dangerous when the accumulation of fluid in the sac is very large. When, however, the valves are inflamed, their constant movement must interfere with recovery. The aortic valves also are liable to become disorganized and to break down from the pressure which they have to sustain; and deposits of fibrine readily take place on the inflamed surfaces, which may produce thrombosis of the orifice, or being separated and conveyed by the current of blood, may cause embolism of the smaller vessels. The mitral valves, though less apt to be immediately disorganized, may equally be the seat of fibrinous deposits causing thrombosis and embolism, and the cordæ tendineæ may give way.

In valvular affections resulting from endocarditis, the danger varies according to the nature of the disease and the particular valves affected. Incompetency of the valves is a more serious defect than simple obstruction. It is also especially dangerous when the aortic valves are affected; whereas obstruction is probably of more importance when seated at the left auriculo-ventricular aperture.

Pericarditic adhesions must necessarily in all cases interfere with the free movement of the heart, and doubtless sooner or later give rise to hypertrophy; yet it is evident that many

persons survive for years in whom the pericardium has become universally attached. I see occasionally a female, who, many years ago, had peri- and endocarditis, with hemiplegia doubtless the result of embolism, and in whom there is every reason to suppose that the pericardium is adherent, yet she has recovered from the paralytic affection and is in a comparatively good state of health. Indeed, all forms of cardiac defect resulting from rheumatism may be recovered from, and are compatible with the enjoyment of health and vigour for a long period, if proper care be taken by the patient. I know several persons who have had serious rheumatic carditis who are now well and able to undergo a considerable amount of exertion. In all cases, however, the greatest care must be taken to avoid over exertion of body or excitement of mind, and exposure to cold: the former might probably again excite the more active symptoms; the latter would be very apt to be followed by a fresh attack of rheumatism, which would probably involve the heart and aggravate the previously existing mischief.

#### *Treatment.*

The treatment which has generally been adopted for the different forms of rheumatic carditis has been either antiphlogistic—leeching or cupping over the region of the heart, the administration of mercurials, &c.; or what may be called expectant—the use of alkalies and salines, &c., as in ordinary cases of rheumatism.

I have long almost entirely abandoned the practice of depletion in any form in cases of carditis; for in a disease which, like rheumatism, is so frequently developed in persons not previously in good health or of delicate constitution, I think all depressing measures very undesirable, if they are not imperatively called for, and I believe that the cases do quite as well when the more expectant plan of treatment is followed. When, however, there is much pain in the region of the heart, the application of a few leeches sometimes affords great relief. Having also seen pericarditis developed in a person under full mercurial action, I cannot think that mercurials are by any means so useful as was supposed by Dr. Latham, though they are probably valuable adjuvants in the treatment when judiciously administered,



tending to check the outpouring of exudation and to assist the absorption of the effused materials.

I generally adopt, or continue if previously in use, the ordinary rheumatic remedies—the alkalies and salines—such as the bicarbonate, tartrate, citrate, or nitrate, of potash; the liquor ammoniæ acetatis, &c., and exhibit small doses of Hydrargyrum cum Cretâ with Dover's powder, applying at the same time blisters over the region of the heart and following them by poultices. When the liquid effusion accumulates, the iodide of potassium is generally combined with these remedies, being given at first in small doses, and the doses being gradually increased, as otherwise from the ready elimination of the iodide by the kidneys, it is of little use. If the patient be very restless or delirious the Dover's powder is given in full doses, or some more powerful anodyne is administered. When the patient's strength begins to fail stimulants are ordered. It is always somewhat difficult to decide when the time has arrived for the exhibition of stimulants, and it is well to commence their use in very small quantities—not more than a teaspoonful of brandy, for instance—and to increase the doses and repeat them more or less frequently, according to the effects produced. If the remedy answers there will be a very obvious improvement in the condition of the patient: he will be less restless and excited, and the pulse will become fuller and firmer; and when judiciously given, I believe there is no class of cases which derives more benefit from the administration of stimulants than the acute inflammatory affections of the heart.

During the progress of the case I continue the administration of the slight mercurial and the iodide, and repeat the application of blisters and poultices over the region of the heart or paint the surface with the tincture of iodine, till the symptoms and signs of active disease subside. The patient is also kept in bed till convalescence is well advanced, and he is only allowed to lie on the outside of the bed or on a couch till he has gained strength and all danger of relapse has passed away. In a large proportion of cases, the patient becomes anæmic towards the end of the attack, and quinine and iron are then given. When after a considerable time has elapsed, there is still some uneasiness in the region of heart and pains are felt in the joints and other parts of the body, advantage may often be



derived from the administration of small doses of iodide of potassium, bicarbonate of potash and colchicum, combined with bark or quinine and iron. In such cases, also, relief is often obtained by the application of belladonna plasters over the præcordia, or by simply covering the surface with some warm material.

Of late years I have generally adopted in cases of rheumatism, whether simple or complicated, the blister treatment as recommended by Dr. Herbert Davies. I believe the blisters to be very efficacious in arresting the inflammation in the joints, and, when several are employed simultaneously or in rapid succession, in relieving the constitutional disturbance also. The benefit which results from the treatment is, I think, in direct proportion to the freedom with which the blisters are applied; and, though the first effect is generally to increase the febrile disturbance and raise the temperature for a few hours, the most remarkable amendment, both local and general, ensues. I have been repeatedly told by patients that the pain caused by the application even of four or five blisters at the same time, is far less than that which they had experienced from the disease. In a recent instance a man, whom I had twice previously treated for acute rheumatism, in the one attack by blisters and in the other by general means, told me that he was much more completely and more rapidly relieved by the blister treatment; which was therefore again employed in his third attack. The blisters are applied around the limb above all the affected joints, and the surfaces are poulticed till they entirely heal. Though I have generally employed the ordinary anti-rheumatic treatment in conjunction with the blisters, when the patients have been much exhausted, from the long duration of the symptoms before admission into the hospital, or from their being the subjects of old heart disease, or being weakened by any other cause, as by prolonged nursing, I have sometimes relied exclusively upon the blisters, and have never had reason to doubt the propriety of having done so. In some cases, however, of very severe rheumatic fever, I have thought, on reviewing the cases, that the constitutional treatment might with advantage have been more freely used in combination with the local measures.

In reference to the effect of the blister treatment upon the

development of the cardiac complications of rheumatism, I believe it is both preventive and curative. As the heart and other internal organs become affected almost always in the earlier and more active stage of the disease, any treatment which tends to shorten the duration of this stage must lessen the liability to the occurrence of such complications; and I have no doubt that more rapid and complete relief of the local inflammation is obtained by blistering than by any other means. I think, however, that the treatment does more than this. I have seen, in cases in which complications were very decidedly threatened, the progress of the internal disease apparently entirely arrested by the application of blisters to all the affected joints at the same time.



